PARKVIEW WATER ASSOCIATION (PWSNO 1280135) SOURCE WATER ASSESSMENT REPORT

January 29, 2002



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Parkview Water Association*, describes the public drinking water wells; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.

Parkview Water Association drinking water is supplied by a single 77-foot deep well pumping from a small alluvial aquifer adjacent to the Spokane River and in the recharge area for the Rathdrum Prairie Aquifer. The Association serves a population of about 90 people in a residential neighborhood across the river from Post Falls, Idaho (figure 1). Parkview Water Association experiences seasonally elevated nitrate levels, and chlorinates its water to control bacterial contaminants entering through the distribution system. A groundwater Susceptibility Analysis conducted by DEQ October 3, 2001 found the well to be highly susceptible to nitrate contamination. The well is moderately susceptible to volatile and synthetic organic chemical and microbial contamination, mostly because of natural risk factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Ground water protection activities for Parkview Water Association should focus on public education in the well recharge zone. For example, the Association could sponsor workshops about septic tank maintenance or the proper application of yard and garden chemicals to address the nitrate loading in its watershed.

Because 186 public water systems in Idaho draw water from the Rathdrum Prairie Aquifer, they should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. Partnerships with state and local agencies and industry groups should also be established.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact your regional Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR PARKVIEW WATER ASSOCIATION

Section 1. Introduction - Basis for Assessment

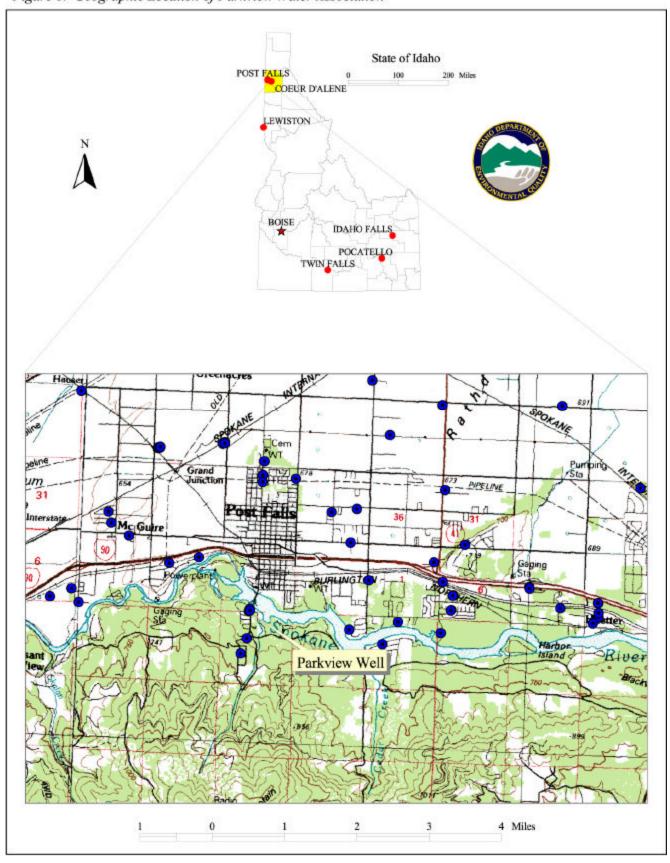
The following sections contain information necessary for understanding how and why this assessment was conducted. It is important to review this information to understand what the ranking of this source means. A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Parkview Water Association



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. DEQ used a refined computer model approved by the EPA to delineate well recharge zones into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well). The model for the Parkview well used data assimilated from a variety of sources including the report *Investigation of Nitrate in Ground Water in a Small Aquifer South of Post Falls, Idaho* prepared for DEQ in 1999 by John Riley of Pyrite Hydrochem. The estimated time of travel between the Parkview well and the aquifer boundaries is one year or less. The 77-foot deep well has an estimated capacity of 80 GPM.

The delineated source water assessment area for Parkview Water Association encompasses 18.5 acres. One leg of the recharge zone stretches southwest from the well for about 1000 feet to a bedrock boundary. The other leg trends eastward to the edge of the aquifer defined by the Spokane River. Water levels in local wells show a hydraulic divide near the greenhouses shown on Figure 2 that accounts for the deeply curved southern boundary of the delineation.

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources in the delineated source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. The maps and inventories DEQ prepared for each system were sent to the system operator for corrections based on local knowledge. Dave Umthun performed this second phase or enhanced inventory for Parkview Water Association.

Figure 2, *Parkview Water Association Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Parkview Water Association well, the recharge zone DEQ delineated for it, and potential contaminant sites in the vicinity. Land use inside the recharge zone is primarily residential with homes on individual septic systems. Part of the greenhouse property, including a dug well that had nitrate levels in the range of 14.1 to 51.6 mg/l when tested in the summer and fall of 1997, lies inside the delineation boundaries.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet, Attachment A, shows in detail how the Parkview Water Association well scored.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The Parkview Water Association well log is on file with DEQ. The last sanitary survey of the system was conducted July 24, 2000. The system is generally well run and in compliance with *Idaho Rules for Public Drinking Water Systems*. The Association has repaired the reservoir roof and well casing as required when the system was surveyed.

The Parkview Water Association drinking water system relies on a single well extracting ground water for domestic use and fire protection. The well, drilled in 1976 to a depth of 77 feet, is completed in a layer of sand. The 6-inch casing extends from 1.5 feet above ground to a depth of 69 feet with a stainless steel screen set from67 to 77 feet below the surface. The puddling clay surface seal extends to a depth of 18 feet, and is completed in a sand and gravel soil stratum. Current Idaho Department of Water Resources (IDWR) standards require a surface seal depth of 20 feet in unconsolidated formations.

Table 1. Selected Construction Characteristics of Parkview Water Association Well

Well	Total Depth (ft.)	Depth of Surface Depth of Casing		Well Screen Static Wa	
		Seal (ft)	(ft)	Depth Range (ft)	Level (ft
Well #1	77	18	69	67-77	30

Figure 2. Parkview Water Association Delineation and Potential Contaminant Inventory. 116°57' 116 56'29 Boat Ramp 11 SOCAL Parkview Well 47042 Dug Well Greenhouses High Density Septic 116°57' 116 56'29 1000 1000 2000 Feet Legend Wellhead RICRIS Site AST Recharge Point Time of Travel Zones SARA Title III Site (EPCRA) Injection Well Group! Site Cyunide Site Business Mailing List PWS # 1280135 Landfill Toxic Release Inventory Wastewater Land App.Site Parkview Water Association CERCLIS Site Mine Well 1

Hydrologic Sensitivity

The hydrologic sensitivity score for the Parkview Water Association well was 6 points out 6 points possible. The score reflects natural geologic conditions at the well site and in the recharge zone. Soils in the well recharge zone as a whole are classed as moderately well drained to well drained. Poorly drained to moderately well drained soils are deemed more protective of ground water than soils which drain faster. The depth to ground water is only 30 feet, which provides little protection from potential contaminants through adsorption and other mechanisms. Sand and gravel fill the soil strata between the topsoil and the water table. There is not a significant clay layer retarding the vertical transport of contaminants.

While the general direction of ground water flow in the aquifer is from southwest to northeast, a 5 foot depression in the water elevation of the Parkview Water Association well relative to other wells in the area was recorded in September and November 1997 as part of the Pyrite Hydrochem study. This results in a localized potential for flow in a northerly and northwesterly direction.

Potential Contaminant Sources and Land Use

Land use inside The Parkview Water Association well recharge zone is mostly high density residential with homes on individual septic systems. Potential contaminants associated with septic systems are bacteria, viruses and nitrates, salts and dissolved solids. Improperly disposed of household chemicals can also enter the ground water through septic systems. Roads near the well and crossing the delineation boundaries appear to carry low volume local traffic and were not counted as potential contaminant sources in the susceptibility analysis. A commercial greenhouse property lies partially within the well recharge zone, and is a known source of ground water contamination.

Historic Water Quality

Parkview Water Association has had several water samples test above the Maximum Contaminant Level for nitrate (10 mg/l). The worst instance was in May 1997 when the concentration reached 22.2 mg/l. The Association monitors quarterly for nitrates, and increases the frequency to weekly tests while nitrate concentrations remain above the MCL. Periods of high nitrate in the water seem to correlate with low water levels in the Spokane River and periods of high rainfall with the associated higher recharge rate for the alluvial aquifer where the well is located. Fertilizer-laden wastewater from the greenhouse and domestic septic systems both appear to have contributed to the high nitrate levels in the Parkview well. After the greenhouse converted to a hydroponic operation to reduce wastewater production, the highest nitrate concentration in Parkview water was 11.6 mg/l recorded in May 2000. While there may not be a full causal relationship between changes in the greenhouse operations and the drop in nitrate concentrations in the Parkview well, it is highly likely that the changes exerted a significant partial influence.

Other inorganic constituents present when the water was tested in 1994 are barium (MCL= 2.0 mg/l) at a concentration of 0.04 mg/l; fluoride (MCL= 4.0 mg/l) at a concentration of 1.1 mg/l; and sodium at a concentration of 5.6 mg/l. Sodium at a concentration of 3.5 mg/l was also detected in a sample tested in 1981

The Association tests monthly for total coliform bacteria, and chlorinates the water prior to distribution. Leaks in the distribution system or cross connections may be the entry points for microbial contamination. Bacteria were present in distribution samples taken in October 1993, October 1994 and May 2001. The last instance was due to a sampling error. Follow-up samples have been negative. Synthetic organic compounds and volatile organic compounds have never been detected in the wells. Radiological contaminants in concentrations far below MCL have been present since testing began in 1981.

Final Susceptibility Ranking

The Parkview Water Association well automatically ranked highly susceptible to inorganic chemical contamination based its nitrate sampling history. The well is on the borderline between the high and moderate risk categories for microbial contamination. System construction and hydrologic sensitivity factors related to local geology added the most points to the microbial susceptibility score for the well. Urban land use and the high density of septic systems in the recharge zone are additional risk factors for microbial contamination.

The well is moderately susceptible to synthetic and volatile organic chemical contamination. Permeable soils and the shallow water table at the well site are the greatest contributors to the well's vulnerability to organic chemical contamination. Cumulative scores in each category are summarized on Table 2. The complete ground water susceptibility analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

The final ranking categories are as follows:

- 0 5 Low Susceptibility
- 6 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 2. Summary of Parkview Water Association Susceptibility Evaluation

Cumulative Susceptibility Scores										
Well Name	System	Hydrologic	Contaminant Inventory							
	Construction	Sensitivity	IOC	VOC	SOC	Microbial				
Well #1	4	6	5	2	2	5				
Final Susceptibility Score/Ranking										
	IOC		VOC	5	SOC	Microbial				
Well #1	High* 10/1		Moderate	10/N	Ioderate	12/Moderate				

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

HIGH* - Indicates source automatically scored as high susceptibility due to presence of bacteria or a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. The state and local health districts have instituted enhanced protection of the ground water in the Rathdrum Prairie Aquifer because of its high use and uniquely pristine water quality. The protections are generally aquifer wide and are not aimed at zones of contribution to a specific well or water system. *The Spokane Valley-Rathdrum Prairie Atlas*, sent to water systems on the prairie when they were invited to perform an enhanced contaminant inventory, describes some of the regional protection measures.

The 186 public water systems in Idaho that draw water from the Rathdrum Prairie Aquifer should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. These types of measures could be used to protect the capture zones of a specific system or group of wells that could be put at risk from local land use changes.

Since nitrate contamination is the greatest challenge facing Parkview Water Association, measures to reduce nitrate loading in the well recharge zone should be the first a priority for ground water protection. Studies of the area indicate that houses with septic tanks are probable contributors to Parkview's nitrate problem. Household use of fertilizer for lawns and gardens can also contribute to the problem. Public education is probably the best counter measure. The Water Association should consider sponsoring ground water protection workshops for residents in the recharge zone, or could send educational materials with water bills.

A workshop on septic tank operation and maintenance should address topics like:

- monitoring the drainfield for signs of failure such as odors or areas of lush vegetation;
- annual inspections and periodic pump outs;
- preventing hydraulic overloading through water conservation;
- proper disposal of household chemicals and pharmaceuticals that can interfere with normal operation of the tank;
- Preventing soil compaction and other damage to the drainfield.

The University of Idaho Cooperative Extension Service could be a resource for pollution prevention ideas related to home gardens and landscape. Some topics to consider are landscaping with native plants; proper household use of fertilizer and pesticides; timing fertilizer applications to avoid periods when ground water nitrate concentrations are likely to rise.

A local greenhouse partially within the zone of capture for the Parkview well is in a consent agreement with DEQ to minimize nitrate contamination of the ground water. When the owner was informed of the discovery of elevated nitrate concentrations in the ground water direct discharge of wastewater to a drywell was stopped immediately. Hydroponic water is now run through sand filters and minor amounts of spent water from the filtration system are applied to bedded plants. The owner is still gathering data on ways to further reduce nitrate losses to the ground water. This agricultural operation will probably continue to have some impact on the ground water, but not at levels that create a significant deterioration of quality.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 343-7001 for assistance with wellhead protection strategies.

A wealth of ground water protection information is available on the Internet. Websites that may be of interest are:

http://www.groundwater.org

http://www.awwa.org.

http://www.epa.gov

A variety of programs are available to encourage public involvement in ground water protection. Programs recommended by the Ground Water Foundation include:

- Groundwater Guardian 800-8584-844
- Walk Your Watershed 800-666-0206
- Home*A*Syst 608-262-0024
- Source Water Mentor Program 540-788-3274

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United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

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Attachment A

Parkview Water Association Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name: PARKVIEW WATER ASSN Source: WELL 1 Public Water System Number: 1280135 10/3/01 9:31:30 AM 1. System Construction SCORE Drill Date 3/13/76 Driller Log Available YES 2000 Sanitary Survey (if yes, indicate date of last survey) YES Well meets IDWR construction standards NO 1 Wellhead and surface seal maintained YES 0 Casing and annular seal extend to low permeability unit NO Highest production 100 feet below static water level NO Well located outside the 100 year flood plain YES Total System Construction Score 2. Hydrologic Sensitivity NO Soils are poorly to moderately drained 2 Vadose zone composed of gravel, fractured rock or unknown YES Depth to first water > 300 feet NO Aquitard present with > 50 feet cumulative thickness NO Total Hydrologic Score IOC VOC SOC Microbial 3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback) Score Score Score Score Land Use Zone 1A URBAN/RESIDENTIAL 2 2 2 2 NO 0 0 0 Farm chemical use high YES HIGH NITRATE IOC, VOC, SOC, or Microbial sources in Zone 1A YES NO NO NO Total Potential Contaminant Source/Land Use Score - Zone 1A 2 2 2 2 Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT) Contaminant sources present (Number of Sources) YES HIGH DENISTY OF SEPTIC 1 0 0 1 (Score = # Sources X 2) 8 Points Maximum 2 0 2 Sources of Class II or III leacheable contaminants or Microbials YES 4 Points Maximum 0 Zone 1B contains or intercepts a Group 1 Area NO 0 0 0 0 Land use Zone 1B Less Than 25% Agricultural Land 0 0 0 0 Total Potential Contaminant Source / Land Use Score - Zone 1B 3 0 0 3 Potential Contaminant / Land Use - ZONE II (6 YR. TOT) Contaminant Sources Present NA 0 0 0 Sources of Class II or III leacheable contaminants or Microbials NA 0 0 0 Land Use Zone II 0 0 Potential Contaminant Source / Land Use Score - Zone II 0 0 Potential Contaminant / Land Use - ZONE III (10 YR. TOT) Contaminant Source Present 0 0 0 NA Sources of Class II or III leacheable contaminants or Microbials NΑ 0 0 0 Is there irrigated agricultural lands that occupy > 50% of Zone 0 0 0 NA Total Potential Contaminant Source / Land Use Score - Zone III 0 0 0 0 Cumulative Potential Contaminant / Land Use Score 5 5 4. Final Susceptibility Source Score 11 10 10 12 5. Final Well Ranking Moderate Moderate

^{*}High susceptibility ranking automatically assigned because of presence of contaminant above MCL in samples from well.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

<u>AST (Aboveground Storage Tanks)</u> – Sites with aboveground storage tanks.

<u>Business Mailing List</u> – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

<u>CERCLIS</u> – This includes sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

<u>Cyanide Site</u> – DEQ permitted and known historical sites/facilities using cyanide.

<u>Dairy</u> – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

<u>Deep Injection Well</u> – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain - This is a coverage of the 100year floodplains.

<u>Group 1 Sites</u> – These are sites that show elevated levels of contaminants and are not within the priority one areas.

<u>Inorganic Priority Area</u> – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

<u>Landfill</u> – Areas of open and closed municipal and non-municipal landfills.

<u>LUST (Leaking Underground Storage Tank)</u> – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

<u>Mines and Quarries</u> – Mines and quarries permitted through the Idaho Department of Lands.)

<u>Nitrate Priority Area</u> – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System)

 Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

<u>Organic Priority Areas</u> – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

<u>Recharge Point</u> – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

<u>UST (Underground Storage Tank)</u> – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

<u>Wastewater Land Applications Sites</u> – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

<u>Wellheads</u> – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.